

**AMENDMENTS TO THE DRAWINGS:**

The attached replacement sheet includes changes to Figs 1 and 3. The replacement drawing sheet, which includes Figs. 1 and 3, replaces the originally-filed drawing sheet. In this replacement drawing sheet, Figs. 1 and 3 have been amended to remove the reference characters  $dm_m$ ,  $l_2$ ,  $a_p$ ,  $D_c$ , and  $b_n$ .

Attachment: Annotated Sheet Showing Changes  
Replacement Sheet

**REMARKS**

Favorable reconsideration is respectfully requested in light of the following remarks, wherein Claims 1-10 have been amended and Claims 11-14 have been withdrawn from the application. Currently, Claims 1-10 are pending in the present application.

As an initial matter, the drawings and specification stand objected to for including references that are not described in the specification. As a result, the drawings have been amended to remove the references. In addition, the Examiner alleges that the features of Claims 7 and 8 are not shown in the drawings, and has rejected these claims under 35 U.S.C. §112, second paragraph. However, the features recited in these claims relate to comparison of values, and need not be shown in the claims. In addition, Applicants have amended the specification to provide clear support for the claimed subject matter. No new matter has been added, because these claims were part of the original specification. Accordingly, withdrawal of the drawing and specification objections and claim rejections under 35 U.S.C. §112, second paragraph, is respectfully requested.

Claims 1-6 and 8-10 stand rejected under 35 U.S.C §102(b) as being unpatentable over U.S. Patent no. 5,609,447 to *Britzke et al.* In addition, Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Britzke et al.* in view of U.S. Patent No. 6,585,460 to *Meece et al.*

A disclosed, non-limiting embodiment of the present invention pertains to a shank end mill, including a shank and a cutting part disposed at a front end of the shank and defining an axis of rotation. An outer periphery of the cutting part therein includes cutting grooves extending helically to a front end face of the cutting part. Main cutting edges extend along an

edge of the cutting grooves. The end face includes end-face cutting edges formed by an intersection of the end face with respective walls of the grooves. A portion of each cutting groove disposed rearwardly of the end face defines a helix angle with a plane containing the axis. The helix angle is larger than a cutting-face angle formed between the end face and a front end section of each cutting groove. The cutting-face angle continuously transforms into the helix angle. The transition from the front end section of each cutting groove forms a sharp cutting edge with a front end surface of the cutting part. These features are now defined in independent Claim 1, as now amended. None of the art of record disclose these patentable features.

*Britzke et al.* discloses a drill bit having a drill body with a cutting tip, wherein the primary or main cutting edges 20 are disposed along the cutting tip 14. In contrast, independent Claim 1 has now been amended to recite that the main cutting edges extend along an edge of the cutting grooves along the outer periphery of the cutting part. In addition, independent Claim 1 has been amended to change the preamble to a shank end mill. In accordance with a shank end mill, the main cutting edges extend around the periphery of the cutting part so that cutting occurs along a lateral direction perpendicular to the axis of the shank. In contrast, a drill is advanced along the axis of the drill.

Moreover, independent Claim 1 has also been amended to recite that the transition from the front end section of each cutting groove forms a sharp cutting edge with the front end surface of the cutting part. This features is shown in the drawings, and described in paragraph [0031] of the present application. In particular, paragraph [0031] states that the tool according to the invention combines the positive properties of the tools with a large helix angle and a clearly

positive secondary cutting edge, i.e., sharp cutting edges, with the stability of a tool with a less positive and optionally even negative cutting edge.

In contrast, *Britzke et al.* discloses rounded cutting edges wherein the apex of the rounding may be centrally arranged or slightly shifted to either side of the apex, but remaining completely rounded. In addition, the rounding of the cutting edges proposed by *Britzke et al.* has a completely different effect on the operation of the tool than the presently claimed shank end mill, where the main cutting work is performed by the cutting edges 5 which remain completely sharp, and having the claimed continuously changing angle with respect to the axis of the tool at the front end surface thereof.

Finally, independent Claim 1 has been amended to recite that the end-face cutting edges are arranged substantially in a common plane, which is typical only for milling tools and not drills. This is shown, for example in Fig. 1, where the cutting edges are slightly inwardly tilted with a negative angle, yet are arranged substantially in a common plane. Accordingly, it is submitted that *Britzke et al.* fails to disclose the patentable features of independent Claim 1.

For at least the foregoing reasons, it is submitted that the shank end mill of independent Claim 1, and the claims depending therefrom, are patentably distinguishable over the applied document. Accordingly, withdrawal of the rejections of record and allowance of the present application is earnestly solicited.

Should any questions arise in connection with this application, or should the Examiner believe a telephone conference would be helpful in solving any remaining issues pertaining to this application, the undersigned respectfully requests that she should be contacted at the number indicated below.

It is believed that no fees are due with this submission. However, should this be incorrect, please charge Deposit Account No. 50-0573.

Respectfully submitted,

**DRINKER BIDDLE & REATH LLP**

A handwritten signature in cursive script, reading "Elaine P. Spector", written over a horizontal line.

Elaine P. Spector

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